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Training Transfer: Perceptions of Computer Use Self-Efficacy among University Employees

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Abstract

This paper investigated transfer of training influences on computer self-efficacy and self-efficacy of computer technologies of training programs that met individual and organization objectives of university personnel. Subsequent to training, an assessment of computer self-efficacy and self-efficacy of computer technologies of employees was necessary for determining their duration and training usefulness. A descriptive survey design was used to gather data from a population of 2,597 university employees. Results indicated employee self-efficacy levels remained stable for a 2 1/2 year period. In addition, select sub-scales of the variables previous classroom computer training and computer use required on-the-job predicted computer self-efficacy. Job type, frequency of computer use, and training responsibilities were also noted to influence the transfer of training process as it pertains to computer self-efficacy.

Introduction

The performances of organizations, according to Heilman and Hornstein (1982), are affected by human forces rather than technical capabilities. For nearly a century, organizations have searched for the means to best achieve their organizational objectives. This quandry is now coupled with the use of progressive computer technology that requires consistent yet scarce human resource proficiency for positive organizational results. Historically, decision makers have overlooked the impact of employee confidence or

self-efficacy in performance as a component in achieving organizational success. Devastating demands and requirements of computer technology are likely to erode one's confidence to perform as well as any desire to undertake any computer-related activities. Employee self-efficacy perceptions of technological advancements are reflected in the performance and proficiency realized by the organization. Workplace performance and the employee's willingness to learn computer technologies and their related tasks are hindered by low self-efficacy levels (Bandura, 1977; Gist, 1987). Consequently, attention to providing workforce preparation that transfers or results in self-efficacious computer technology interaction is a necessity.

The Foundation of Self-Efficacy

A representative definition of self-efficacy is an individual's belief in their ability to perform a particular task (Bandura, 1977; Bandura, 1982; Gist, 1989). Beginning some 20 years ago, researchers posited that performance was a result of human interactions, mental cognition, and perceived self-efficacy. Although this framework produced performance, the degree of activity varied from proficient to reactive. As a result, the level of self-efficacy one achieves through human interactions and mental cognition is the focus believed to generate positive and skilled transfer to work environments. Bandura (1977) stated that information needed to make self-efficacious judgments are obtained by (a) performance accomplishments or enactive mastery, (b) vicarious learning experiences, (c) verbal persuasion, and (d) physiological arousal. Performance accomplishments make a cognitive register in which self-thought compares the possibilities of future task attainment. Bandura (1982) said

> People register notable increases in self-efficacy when their experiences disconfirm misbeliefs about what they fear and when they gain new skills to manage threatening activities. If in the course of completing a task, they discover something that appears intimidating about the undertaking, or suggests limitations to their mode of coping, they register decline in self-efficaciousness despite their successful performance (p.125-126).

In the same study, he referred to verbal persuasion as the use of conversation and collaboration to reach a level of self-efficacy. Physiological arousal, conversely, acts as the responsible agent for changing emotions to fit a self-efficacy judgment mode. Vicarious learning experiences occur by watching and absorbing the struggles and successes of others (Popper & Lipschiz, 1993).

Gist (1989), and Gist and Mitchell (1992) noted self-efficacy as the basis for choosing what to do, sustaining amount of effort needed for attainment, and preserving experiences. Bandura (1977) found self-efficacy judgments to result in four types of behavior: (a) performance, (b) coping, (c) arousal, and (d) persistence of situations individuals choose for themselves. Bandura (1982) noted self-efficacy as a determinant of choice behavior because it influences the choice of behavioral settings. When individuals recognize coping as inadequate for addressing threatening situations, those situations are avoided. On the other hand, if people feel coping is acceptable, they may participate in that kind of situation. Bandura (1988) wrote that three elements: (a) skills matched with basic competencies, (b) complex skills broken down into sub-skills, and (c) learning to apply skill competencies and sub-skills with different people and circumstances result in positive performance. He emphasized new skills are rarely used for long unless they are applied in work situations which provide an environment of experience for building personal confidence. Accordingly he said self-efficacy:

> in dealing with one's environment is not a fixed act or simply a matter of knowing what to do. Rather, self-efficacy involves a generative capability in which component, cognitive, social, and behavioral skills must be organized into integrated courses of action to serve innumerable purposes....Self-efficacy judgments, whether accurate or faulty, influence choice of activities and environmental settings (p.122-123) .

Bandura (1977, 1982) contended that training programs can influence sources of information that, in turn, result in self-efficacy judgments to reliably measure performance in program objectives.

Self-efficacy theory is applicable in numerous settings, which require performance or where performance is expected. In this study, self-efficacy is considered within the context of computers and computer technologies. Murphy, Coover, and Owen (1988) defined computer self-efficacy as an individual's belief that they can perform a specific computer task. Narrowing the definition of self-efficacy, Kinzie and Delcourt (1991) recognized fluctuating levels of self-efficacy with regard to specific technologies and derived the term self-efficacy of computer technologies. They defined self-efficacy of computer technologies as an individual's belief in their ability to use a specific computer technology such as word processing, electronic mail, and CD-ROM data bases.

Review of Literature

Self-efficacy and computer use of technology transfer research is quite incomplete with regard to the combination of employees, work environments, and their computer use/technology impact on organizational development. Existing studies utilize service and sales organization employees such as nurses, clerical, administrative or professional, and sales representatives to determine factors that explain self-efficacy (Chowdhury, 1990; Connell, 1989; Davis, 1994; Earley, 1994; Henry & Stone, 1994; Lee & Gillen, 1989; Parker, 1993). Parker (1993) and Earley (1994) were the sole researchers in addressing factors impacting computer use self-efficacy. Utilizing students and industry employees, some studies recognized computer self-efficacy as a component of user acceptance in e-mail (Minuet, CC:Mail) and gopher information technology (Venkatesh & Davis, 1994; Venkatesh & Davis, 1997, Forthcoming; Yi & Venkatesh, 1996). Venkatesh and Davis (1994) supported hands-on training as a significant difference in self-efficacy and perceived ease of use. E-mail self-efficacy was also the focus of a study using university faculty (Kandies, 1994). Several studies used a variety of university employees and state government employees to analyze how aspects of work affected general self-efficacy (Jex & Gudanowski, 1992; Kennedy, 1993; Latham & Frayne,1989; Prieto & Altmaier, 1994). Computer self-efficacy and self-efficacy of computer technology studies historically have utilized students as a focal population (Ellen, 1987; Kinzie & Delcourt, 1991; Murphy et al, 1988; Patterson, 1984; Prieto & Altamaier, 1994).

Purpose of the Study

The purpose of this study is to convey results of transfer of training influences on computer self-efficacy and self-efficacy of computer technologies subsequent to training and self-efficacy duration for training usefulness.

Rationale for the Study

With computer technology being a major component in workplace performance, creating educational and training programs that actually transfer computer technology skills from the classroom to the work environment continues to be a vital focus of vocational education. The present study provides vocational educators with information for improving, monitoring, and evaluating their programs. This study will specifically suggest instructional techniques and activities required in classroom and performance-based training to ensure positive performance at school and positive transfer to the workplace. Moreover, the study provides information necessary for the appropriate placement of students in internships, career-to-work, and cooperative arrangements for an ultimate awareness of occupational responsibilities. Knowledge of the duration of computer self-efficacy is an additional benefit of this study because it provides educators with a timeline framework for curriculum development and continuing education.

Research Objectives

Specific research objectives addressed by this study were:

1. To determine differences in computer self-efficacy among university employees with regard to time, job type, previous computer classroom training, computer use required on the job, training responsibilities, and frequency of computer use.
2. To determine differences in self-efficacy of computer technologies among university employees with

regard to time, job type, previous computer classroom training, computer use required on the job, training responsibilities, and frequency of computer use.

Procedures and Methodology

A Computer Self-Confidence Assessment, distributed through the campus mail system, was used to gather data from a population of 2,597 university employees who had received computer training in a 2 1/2 year period. A total of 357 responses from a sample of 448 provided an overall response rate of 80%. Dillman (1978) indicated response rate is determined by dividing the number of questionnaires returned by the number in the sample minus those ineligible. Although the National Education Association research bulletin (1960) indicated a required sample size of 335 to ensure a 95% confidence level, the researcher felt it prudent for population generalization to have a random sample size of 500. Of the sample size, fifty-two questionnaires were associated with trainees who were ineligible which resulted in 448 viable assessments. Non-respondents were sent follow-up letters one week and two weeks after the first mailing culminating with a third follow-up attempt to encourage participation or to gain completions by phone. The Computer Self-Confidence Assessment consisted of a background segment for gathering demographic information, the computer self-efficacy scale (CSE), and the self-efficacy of computer technology scale (SCT).

The CSE scale measured the degree of confidence people have about computer knowledge and skills after a training experience (Murphy et al., 1988). Scale items consisted of 32 activity statements developed from course designs for teaching graduate students and practicing professionals how to use micro and mainframe computers. The CSE asked individuals to rate their degree of confidence in performing the listed computer activities on a 5-point Likert-type scale ranging from 1 equaling very little confidence to 5 equaling quite a lot of confidence. No specific descriptors were associated with scale values 2, 3, and 4. The scale reliability was validated by a factor analysis with oblique rotation accompanied by a Cronbach alpha of .95 (Torkzadeh & Koufteros, 1994).

The SCT scales measured self-efficacy of specific computer technologies such as word processing, electronic mail, and CD-ROM data bases (Kinzie & Delcourt, 1991). The scale contained a total of 27 activity items with 10 sub-scale items related to word processing, 10 items related to electronic mail, and seven items related to compact disc (CD-ROM) data bases. Study participants rated their degree of confidence by strongly disagreeing or strongly agreeing with the confidence statements on a 4-point Likert-type scale (1 = Strongly Disagree, 4 = Strongly Agree). The scale was validated by a pilot study utilizing a panel of 17 experts consisting of computer technology instructors, measurement experts, educational consultants, and graduate students. A critique of the questionnaire was also provided by a university instrument review committee. After the pilot study, a Cronbach alpha of .84 was determined.

The Background Information section of the assessment asked the employees for demographic information such as previous classroom computer training, types of computer use required on the job, frequency of computer use, and training responsibilities. Time and job type data were provided by the Office of Human Resources Management at The University of Tennessee. The demographic data collected became the independent variables in the study.

Upon collection and compilation of the Computer Self-Confidence Assessments, data analyses were performed using The University of Tennessee, Knoxville, VMS/VAX mainframe computer system. The specific statistical analysis was performed using the SAS® (SAS Institute, 1985) statistical software residing on the VMS/VAX system.

With multiple continuous dependent variables and multiple discrete independent variables, the research objectives were best addressed using multivariate analysis of variance (MANOVA). The MANOVA procedure was used to determine significant differences ($p < .05$) of time, job type, previous computer classroom training, computer use required on the job, training responsibilities, and frequency of computer use, on computer self-efficacy and self-efficacy of computer technologies. By applying the Wilks' lambda multiple comparison follow-up procedure on each test of the independent variables on the dependent

variables, significant mean differences could be detected. For significant differences found by the Wilks' lambda, the Tukey HSD post hoc test addressed all pairwise comparisons among the independent variable (job type, frequency of computer use) sub-scales.

The dependent variables were the CSE and SCT scores while specific independent variables considered were time (between training and survey time; 0-6 months, 6-months -1 year, 1 year-1.5 years, 1.5 years-2 years, 2 years-2.5 years), job type (clerical/administrative, maintenance/technical, faculty), previous classroom computer training (database management, word processing, statistical processing spreadsheets, programming, educational software), computer use required on the job (database management, word processing, statistical processing, spreadsheets, programming, educational software), frequency of computer use (always, frequently, seldom, never), and training responsibilities, respectively.

Results

Research Objective 1

To determine differences in computer self-efficacy among university employees with regard to time, job type, previous computer classroom training, computer use required on the job, training responsibilities, and frequency of computer use.

As shown in Table 1, the MANOVA disclosed significant differences in computer self-efficacy of university employees with regard to job type, previous classroom computer training (database management), computer use required on the job (database management, statistical processing, spreadsheets, programming, and educational software), frequency of computer use, and training responsibilities. However, there was no significant difference found in computer self-efficacy pertaining to time between training and survey time.

Table 1

Multivariate Analysis of Variance for CSE Scores of Respondents Classified by Independent Variables

Source		df	SS	F	Pr>F+
CSE					
	Job Type	2	6523.796	3.47	.0323*
	Time	4	1387.308	.36	.8365

Previous Classroom Computer Training				
Database Manage	1	14332.097	18.31	.0001*
Word Processing	1	1387.785	1.77	.1840
Statistical Processing	1	1890.600	2.42	.1211
Spreadsheets	1	305.946	.39	.5323
Programming	1	2219.990	2.84	.0931
Educational Software	1	201.959	.26	.6118
Computer Use Required on the Job				
Database Management	1	13960.812	20.36	.0001*
Word Processing	1	208.771	.30	.5815
Statistical Processing	1	2871.897	4.19	.0415*
Spreadsheets	1	13627.338	19.87	.0001*
Programming	1	4553.439	6.64	.0104*
Educational Software	1	3381.843	4.93	.0271*
Frequency of Use	3	101746.575	50.69	.0001*

Training	1	10175.198	10.90	.0011*
* p < .05				

Research Objective 2

To determine differences in self-efficacy of computer technologies among university employees with regard to time, job type, previous computer classroom training, computer use required on the job, training responsibilities, and frequency of computer use.

Table 2 demonstrates significant differences in the self-efficacy of computer technology among university employees with regard to previous classroom computer training (database management, statistical processing), computer use required on the job (database management, statistical processing, programming, and educational software), frequency of computer use, and training responsibilities. In contrast to research objective one, job type among university employees had no significant impact on SCT scores. Similar to CSE results, no significant difference was found in SCT scores with respect to time between training and survey time.

The Wilks' lambda multiple comparison follow-up procedures, as shown in Table 3, revealed significant differences in composite computer self-efficacy and self-efficacy of computer technologies scores of university employees with respect to job type, previous classroom computer training (database management), computer use required on the job (database management, spreadsheets, programming, educational software), frequency of computer use, and training responsibilities.

Tukey's Honestly Significant Difference (HSD) all pairwise procedure as shown in Table 4, indicated a significant difference in CSE mean scores among clerical/administrative and faculty employees. Table 5 revealed Tukey HSD post hoc significant differences in CSE and SCT mean scores among those participants using computers always and those using computers frequently, never, and seldom. Other significant differences were noted in CSE and SCT mean scores between those using computers frequently and those using computers seldom and never.

Table 2
Multivariate Analysis of Variance for SCT Scores of Respondents Classified by Independent Variables

Source	df	SS	F	Pr>F
SCT				
Job Type	2	1030.731	1.52	.2209
Time	4	401.670	.29	.8829

Previous Classroom Computer Training				
Database Management	1	5531.120	20.39	.0001*
Word Processing	1	315.771	1.16	.2814
Statistical Processing	1	1064.938	3.93	.0484*
Spreadsheets	1	544.999	2.01	.1573
Programming	1	626.512	2.31	.1296
Educational Software	1	403.057	1.49	.2238
Computer Use Required on the Job				
Database Management	1	1730.186	6.75	.0098*
Word Processing	1	27.069	.11	.7454
Statistical Processing	1	1380.465	5.38	.0210*
Spreadsheets	1	870.975	3.40	.0662
Programming	1	2941.893	11.48	.0008*
Educational Software	1	1549.418	6.04	.0145*
Frequency of Use	3	28909.943	36.94	.0001*

Training	1	1987.332	5.88	.0158*

*p<.05

Table 3
Multivariate Analysis of Variance for Mean Scores of Respondents Classified by Independent Variables

Source	Wilksí Lambda	df	F	Pr>F
SCT				
Job Type	.9684	4,690	2.7877	.0257*
Time	.9779	8,686	.9592	.4669
Previous Classroom Computer Training				
Database Management	.9326	2,311	11.2333	.0001*
Word Processing	.9943	2,311	.8977	.4086
Statistical Processing	.9875	2,311	1.9719	.1409
Spreadsheets	.9889	2,311	1.7858	.1899
Programming	.9904	2,311	1.5085	.2229
Educational Software	.9943	2,311	.8871	.4129

Computer Use Required on the Job				
Database Management	.9377	2,315	10.4716	.0001*
Word Processing	.9990	2,315	.1556	.8559
Statistical Processing	.9822	2,315	2.8538	.0591
Spreadsheets	.9317	2,315	11.5449	.0001*
Programming	.9647	2,315	5.7572	.0035*
Educational Software	.9798	2,315	3.2515	.0400*
Frequency of Use	.6791	6,684	24.3380	.0001*
Training	9689	2,340	5.4529	.0147*

*p<.05

Table 4
Tukey's Honestly Significant Difference (HSD)[a] Procedure (Simultaneous Confidence Intervals) for Comparisons of Subscale Means for Variable of Job Type

Job Type Subscale	Lower Confidence Limit	Mean	Upper Confidence Limit
CSE*			
Ca[b] - Mt[b]	13.836	2.860	19.556

CA - F[b]	7.263	20.765	34.267*
MT - F	3.158	17.905	38.967
SCT			
CA - MT	11.190	-.480	10.230
CA - F	-4.681	3.980	12.641
MT - F	-9.051	4.460	17.972

[a]Controlling for Type I experimentwise error rate at .05 level of significance
[b]Job Type: CA = Clerical/Administrative, MT = Maintenance/Technical, F = Faculty
*Group means are significantly different

Table 5

Tukey's Honestly Significant Difference (HSD)[a] Procedure (Simultaneous Confidence Intervals) for Comparisons of Sub-scale Means for Variable of Frequency of Computer Use

		Lower		Upper
		Confidence		Confidence
Frequency of Use Sub-scales		Limit	Mean	Limit
CSE*				
	A[b] - F[b]	15.050	22.642	30.234*
	A - N[b]	32.630	56.735	80.840*

	A - S[b]	44.130	60.202	76.274*
	F - N	9.772	34.093	58.413*
	F - S	21.166	37.560	53.954*
	N - S	-24.678	3.467	31.613
SCT*				
	A[b] - F[b]	6.174	10.914	15.654*
	A - N[b]	13.480	28.530	43.581*
	A - S[b]	24.088	34.123	44.158*
	F - N	2.431	17.616	32.802*
	F - S	12.973	23.209	33.444*
	N - S	-11.981	5.592	23.165

[a]Controlling for Type I experiment wise error rate at .05 level of significance
[b]Frequency of Computer Use: A = Always, F = Frequently, S = Seldom, N = Never
* Group means are significantly different
* $p < .05$

Conclusions and Discussion

Results of this study illustrated influences to be considered when designing training or instruction that ensures transfer to the wor k environment. Job type, previous classroom computer training (database management), computer use required on the job (database management, statistical processing, spreadsheets, programming, and educational software), frequency of computer use, and training responsibilities as having a predictive relationship to computer self-efficacy. Therefore, it can be posited that a person's job type coupled

with job-like training is indicative of high levels of computer self-efficacy and thus, high performance. Whereas, a person's job type without the necessary training yields unproductive performance. Results of Tukey's HSD procedure reveals that the training provided more closely matches the needs of clerical/administrative employees rather than faculty members. Previous classroom computer training, specifically in database management, also aids in the transfer of instruction to positive performance in the workplace. Specific components of database management classroom training could be responsible for higher self-efficacious performance. Further, it is suggested that with most sub-scales of computer use required on the job being significant, instruction or training which mirrors job performance is also characteristic of higher self-efficacious performance. Similarly, increased frequency of one's computer use is an assurance of higher proficiency. Moreover, an employee who's responsibilities include training other employees on the use of computers are more confident in performing their own computer task. It can be inferred that additional opportunities to exhibit skill produce higher employee performance. This higher activity could be attributed to the employee's recognition of respect on the part of authorities that assign job tasks or self-efficacy of computer technologies.

While providing a short distance between the time of training and performance has long been considered a necessary ingredient to transfer, this study indicates it as insignificant. According to the results and utilizing a 2 1/2 year time span, time distance did not impact computer self-efficacy or self-efficacy in specific technologies. Computer self-efficacy and self-efficacy of computer technologies did not fluctuate regardless of how long ago training was received. It can also be said that employees remained confident in their job performance despite when they were trained. It appears that with training as a prerequisite or to some existence, employees continue to be self-efficacious for a 2 1/2 year period. Therefore, the duration of computer self-efficacy of the training provided in this study is 2 1/2 years.

Recommendations and Implications

Vocational educators and administrators, in times of scarce funding and appropriations, are increasingly required to provide justification that their programs are contributing to overall workforce development--both employee and the organization. Vocational educators and institutions that fail to provide productivity required in the workplace will be negatively impacted by support and reputations for developing human resources. This study re-emphasizes the necessitated role of vocational expertise in equipping any and all human beings with workplace skills. Regardless of the location of work, vocational educators and administrators are needed for their knowledge of learning behavior, instructional design, and skill-based sequencing and development. Studies of self-efficacy open additional windows of opportunity and a continued monopoly of ingenuity for vocational educators in workforce development. This study supplies vocational administrators and educators with adaptable workforce programs. Since an employee's job type and computer use required on the job combined with appropriate training is likely to exhibit positive transfer, the researcher recommends that educators make continuous efforts to determine computer skills required in the workforce and to develop programs to match those job needs. For internship, career-to-work, and cooperative job placements, it is important that vocational personnel ensure correct student skill matches with job responsibilities. Vocational personnel could also use the self-efficacy scales in this study to monitor the effectiveness of their programs. By surveying students who have been placed or those who have found jobs after matriculation, training and educational programs could be revised accordingly.

The researcher also recommends that vocational educators be privy to components of their computer curriculums that can produce self-efficacy. As with database management, there may be aspects of this training that can be introduced in other courses, which will ensure general self-efficacy. Classroom computer education and training should also emphasize consistent use of the computer in class as well as outside classwork so that an individual's confidence in performance will continue building. According to the findings and conclusions of this study, computer self-efficacy infers training transfer, which is likely when students have the opportunity to train others. Therefore, educators should make use of students as teachers in their computer classrooms. By allowing students the responsibility of training others on the computer, they may develop a responsible interest in another's learning as well as meet the frequency requirement in computer use for transfer. Additionally, these student teachers and trainers could experience enhanced performance that

would otherwise have been average.

Because time did not impact computer self-efficacy and self-efficacy of computer technologies in a 2 1/2 year period, educators can assume that quality instruction remains self-efficacious and produces proficient performance for this amount of time. However, prior to this timeframe, educators should be prepared to upgrade computer training and to implement a continuing computer education program to maintain confidence and consistency in performing computer tasks as technology changes.

References

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191-215.

Bandura, A. (1982). Self-efficacy mechanism in human accuracy. *American Psychologist, 37,* 122-147.

Bandura, A. (1988). Organizational applications of social cognitive theory. *Australian Journal of Management, 13,* 275-302.

Chowdhury, J. (1990). The impact of externally set goals on motivation and performance in the sales force (Doctoral dissertation, The University of Florida, 1990). *Dissertation Abstracts International, 53*, 1220

Connell, D. J. (1990). A comparison of job satisfaction among clerical employees at four different types of higher educational institutions (Doctoral dissertation, University of Kentucky, 1990). *Dissertation Abstracts International, 50,* 3859.

Davis, S. (1994). End-user computing: An analysis of the demographic situational and learning style variables leading to perceived advanced skill (Doctoral dissertation, University of LaVerne). *Dissertation Abstracts International, 55*, 2190.

Dillman, D. (1978). *Mail and telephone surveys: The total design method*. New York: John Wiley & Sons.

Earley, P. C. (1994). Self or group? Cultural effects of training on self-efficacy and performance. *Administrative Science Quarterly, 39,* 89-117.

Ellen, P. S. (1987). The impact of self-efficacy and performance satisfaction on resistance to change (Doctoral dissertation, University of South Carolina, 1987). *Dissertation Abstracts International, 48,* 2106.

Gist, M. E. (1987). Self-efficacy: Implications for organizational behavior and human resource management. *Academy of Management Review, 12,* 472-485.

Gist, M. E. (1989). The influence of training method on self-efficacy and idea generation among managers. *Personnel Psychology, 42,* 787-805.

Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis: Of its determinants and malleability. *Academy of Management Review, 17* (2), 183-211.

Heilman, M. E., & Hornstein, H. A. (1982). *Managing human forces in organizations.* Homewood, IL: Irwin.

Henry, J. W., & Stone, R. W. (1994). A structural equation model of end-user satisfaction with a computer-based medical information system. *Information Resources Management Journal, 7* (3), 21-33.

Jex, S. M., & Gudanowski, D. M. (1992). Efficacy beliefs and work stress: An exploratory study. *Journal of Organizational Behavior, 13* (5), 509-517.

Kandies, J. T. (1995). Electronic mail: Attitudes, self-efficacy, and effective communication (Doctoral dissertation, Virginia Polytechnic Institute and State University, 1995). *Dissertation Abstracts International, 55*, 2255.

Kennedy, D. M. (1993). The relationship between faculty members' level of computer use and computer self-efficacy (Doctoral dissertation, Eastern Michigan University, 1993). *Dissertation Abstracts International, 31*, 516.

Kinzie, M. B., & Delcourt, M. A. B. (1991). *Computer technologies in teacher education: The measurement of attitudes and self-efficacy*. Chicago, IL: American Educational Research Association. (ERIC Document Reproduction Service No. ED 331 891)

Latham, G. P., & Frayne, C. A. (1989). Self-management training for increasing job attendance: A follow-up and a replication. *Journal of Applied Psychology, 74* (3), 411-416.

Lee, C., & Gillen, D. J. (1989). Relationship of type A behavior pattern: Self-efficacy perceptions on sales performance. *Journal of Organizational Behavior, 10* (1), 75-81.

Murphy, C. A., Coover, D., & Owen, S. V. (1988). *Assessment of computer self-efficacy: Instrument development and validation*. New Orleans, LA: National Council on Measurement in Education. (ERIC Document Reproduction Service No. ED 307 317)

National Education Association Research Division. (1960). Table for determining sample size from a given population. *Research Bulletin, 38*, 99.

Parker, L. E. (1993). When to fix it and when to leave: Relationships among perceived control, self-efficacy, dissent, and exit. *Journal of Applied Psychology, 78*, 949-959.

Patterson, D. P. (1984). The effects of certain verbal persuasion procedures on self-efficacy (Doctoral dissertation, Arizona State University, 1984). *Dissertation Abstracts International, 45*, 727 .

Popper, M., & Lipschiz, R. (1993). Putting leadership theory to work: A conceptual framework for theory based leadership development. *Leadership and Organization Development Journal, 14* (7), 23-27.

Prieto, L. R., & Altmaier, E. M. (1994). The relationship of prior training and previous teaching experience to self-efficacy among graduate teaching assistants. *Research in Higher Education, 35* (4), 481-497.

SAS Institute Inc. (1985). *SAS/STAT guide for personal computers, version 6 edition*. Cary, NC: SAS Institute.

Torkzadeh, G., & Koufteros, X. (1994). Factorial validity of a computer self-efficacy scale and the impact of computer training. *Educational and Psychological Measurement, 54* (3), 813-821.

Venkatesh, V., & Davis, F. D. (1994). *Modeling the determinants of perceived ease of use*. [On-line]. Abstract from: International Conference on Information Systems. Available: http://webfoot.csom.umn.edu/faculty/phds/venki/cse2.htm

Venkatesh, V., & Davis, F. D. (1997, forthcoming). A model of the antecedents of perceived ease of use: Development and test [On-line]. *Decision Sciences*. Available: http://www.CSE1ai.htm

Yi, M. Y., & Venkatesh, V. (1996). Role of computer self-efficacy in predicting user acceptance and use of information technology. [On-line]. Available: Internet: http://hsb.baylor.edu/ramsower/ais.ac96/papers/mun.html